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ABSTRACT SUBMITTAL FORM

Unclassified Abstract
(250-300 words; do not include figures or tables)

NASA's ARES I-X vehicle launched on a suborbital test flight from the Eastern Range in Florida on October 28, 2009. NASA generated a Range Safety (RS) flight data package to meet the RS trajectory data requirements defined in the Air Force Space Command Manual 91-710. Some products included in the flight data package were a nominal ascent trajectory, ascent flight envelope trajectories, and malfunction turn trajectories. These data are used by the Air Force's 45th Space Wing (45SW) to ensure Eastern Range public safety and to make flight termination decisions on launch day. Due to the criticality of the RS data in regards to public safety and mission success, an independent validation and verification (IV&V) effort was undertaken to accompany the data generation analyses to ensure utmost data quality and correct adherence to requirements. Multiple NASA centers and contractor organizations were assigned specific products to IV&V. The data generation and IV&V work was coordinated through the Launch Constellation Range Safety Panel's Trajectory Working Group, which included members from the prime and IV&V organizations as well as the 45SW. As a result of the IV&V efforts, the RS product package was delivered with confidence that two independent organizations using separate simulation software generated data to meet the range requirements and yielded similar results. This document captures ARES I-X RS product IV&V analysis, including the methodology used to verify inputs, simulation, and output data for an RS product. Additionally a discussion of lessons learned is presented to capture advantages and disadvantages to the IV&V processes used.